Operation Iraqi Freedom Fatality Update: Data through 31 Jan 04

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Mortality

Office of the Armed Forces Medical Examiner

- Led by Dr. Craig Mallak
- Has autopsied all but one OIF death
- Through the Mortality Surveillance Division, rapidly identifies Active Duty casualties regardless of location
- Aggressively pursued autopsies on fatalities who have been deployed to capture post-OIF cases
- Goal: Thorough evaluation of all OIF fatalities
  - Tissue collection in “natural” cases
  - Toxicological testing of all deaths

Mortality
Surveillance

Process

- Recognition of Casualties:
  - Reports from field, Mortuary Affairs
  - Fox News/CNN
  - Casualty reports
  - Army CID
  - Army Safety
- Autopsies performed under Title 10 USC 1471:
  - Dover Port Mortuary
  - Landstuhl Mortuary Facility
  - Medical Treatment Facilities

Mortality
Surveillance

Process (2)

- Identification of Remains:
  - Fingerprint (Latent Fingerprint Section, FBI)
  - Dental (Forensic Odontology, AFIP)
  - DNA (Armed Forces DNA Identification Lab)

First Method of Identification	
FP	291
FP/Dental	133
Dental	22
DNA	17
Pending	1
Total	464

Process (3)

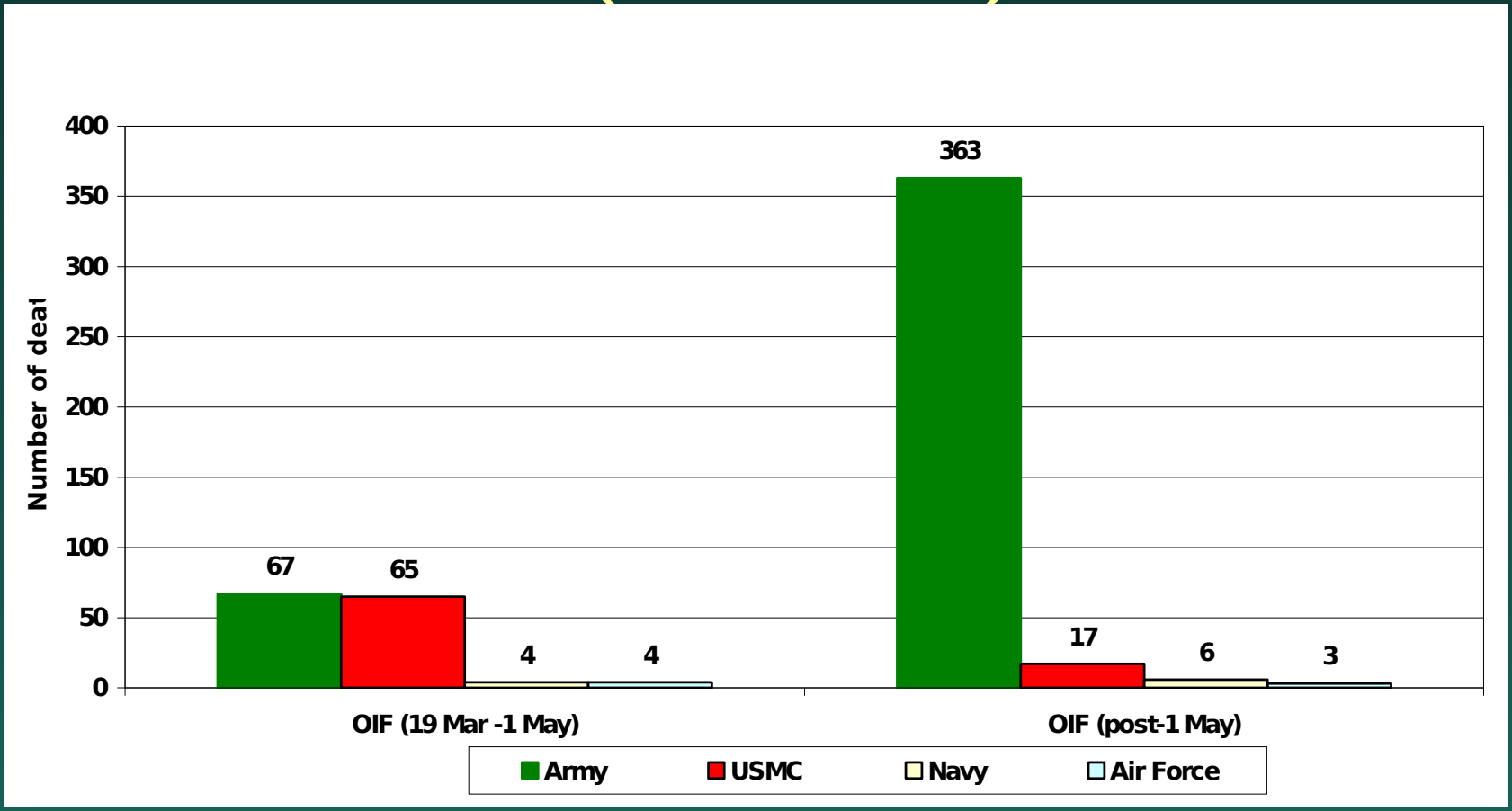
- Determination of cause and manner of death:
  - Full autopsy
  - Toxicological analysis
  - Natural deaths aggressively investigated
    - Extensive use of consultants (CV and neuro path)
    - Tissue collection for histology, immunohistochemistry stains, later analysis

Case Definition of an "OIF death"

- Died in Iraq or supporting areas (e.g. Kuwait) or from a condition identified in theater within 120 days of return
- Exception to 120 day rule for consequences of wounds obtained from hostile action
- Parallels Directorate for Information Operations and Reports (DIOR), which is the official source for casualty statistics
  - Reports limited to Manner of Death
  - Exception: DIOR excludes Suicides from 120 day follow-up

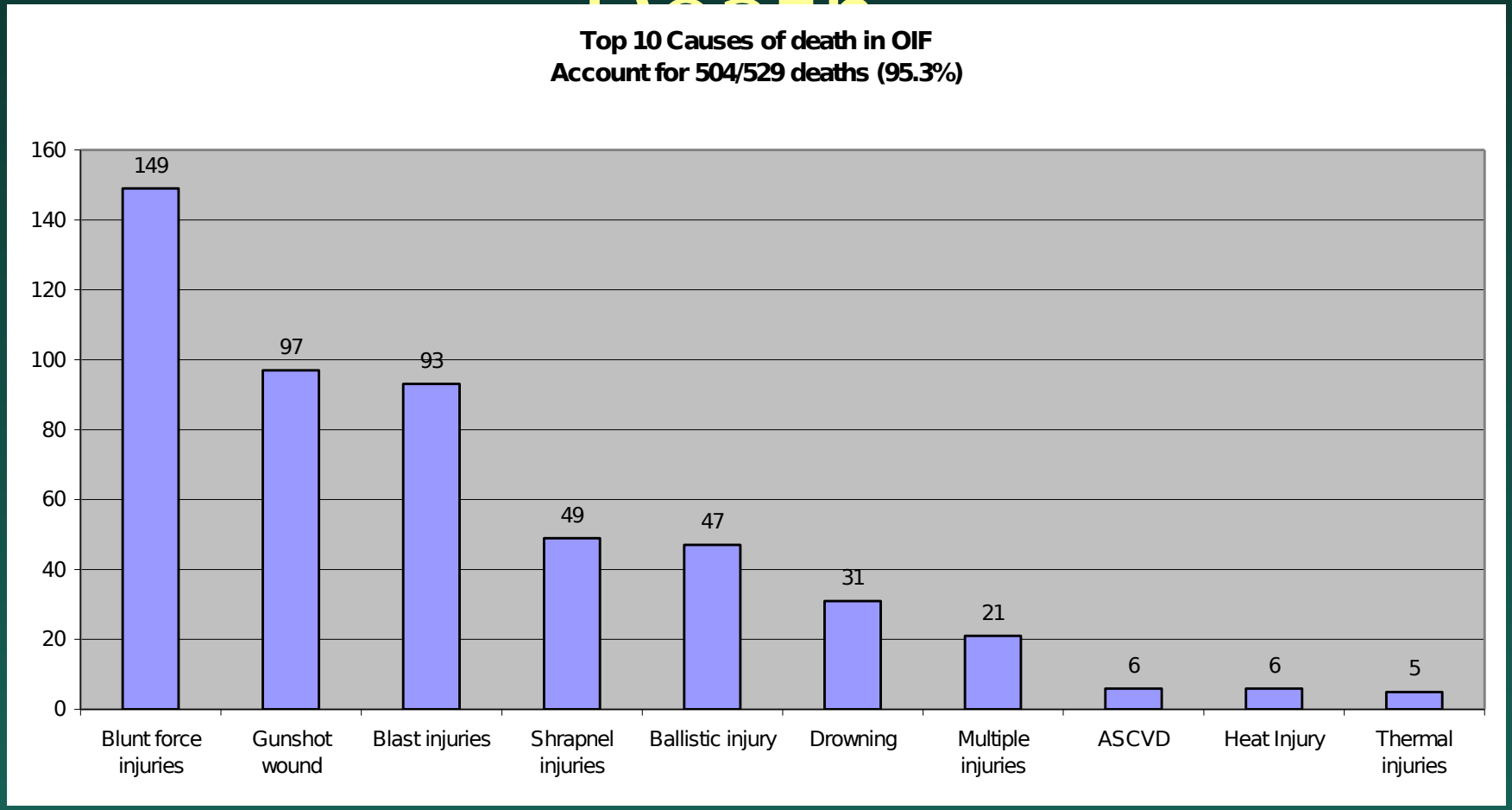
Mortality

OIF Fatalities by Service (n=529)



Mortality Surveillance

Overall OIF Cause of Death

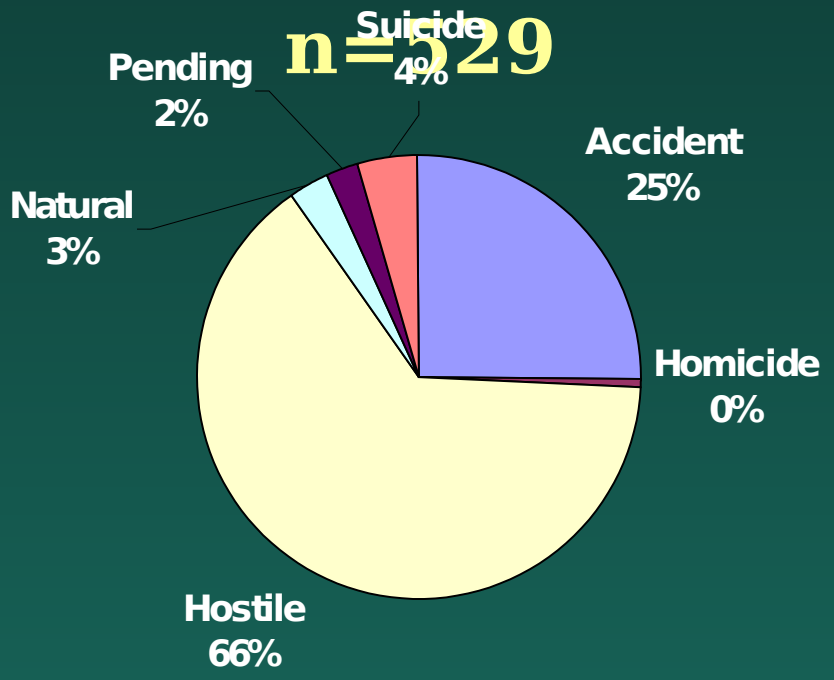


Mortality Surveillance

OIF compared with ODS

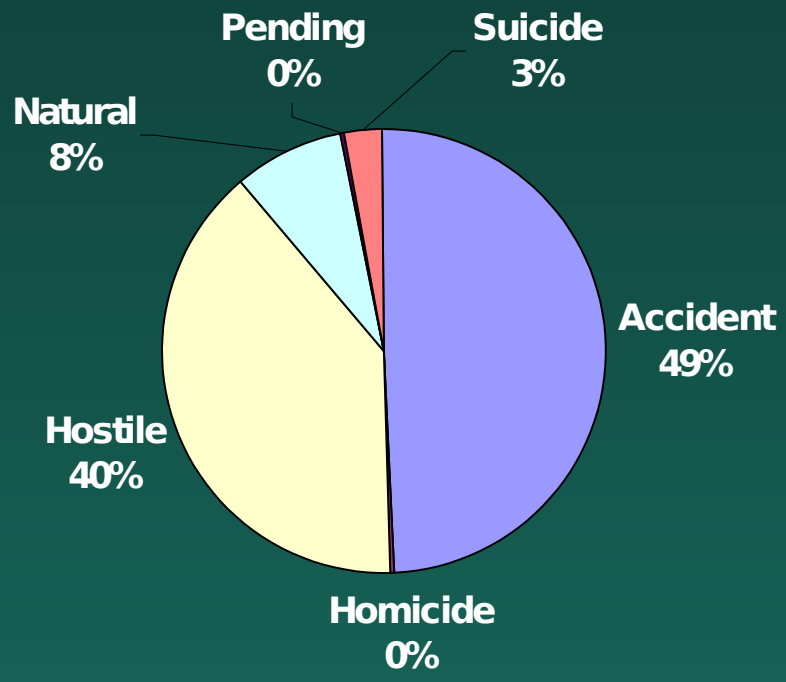
OIF: 21 Mar03 - 31 Jan04

n=529



ODS: 1 Aug90 – 31 Jul91

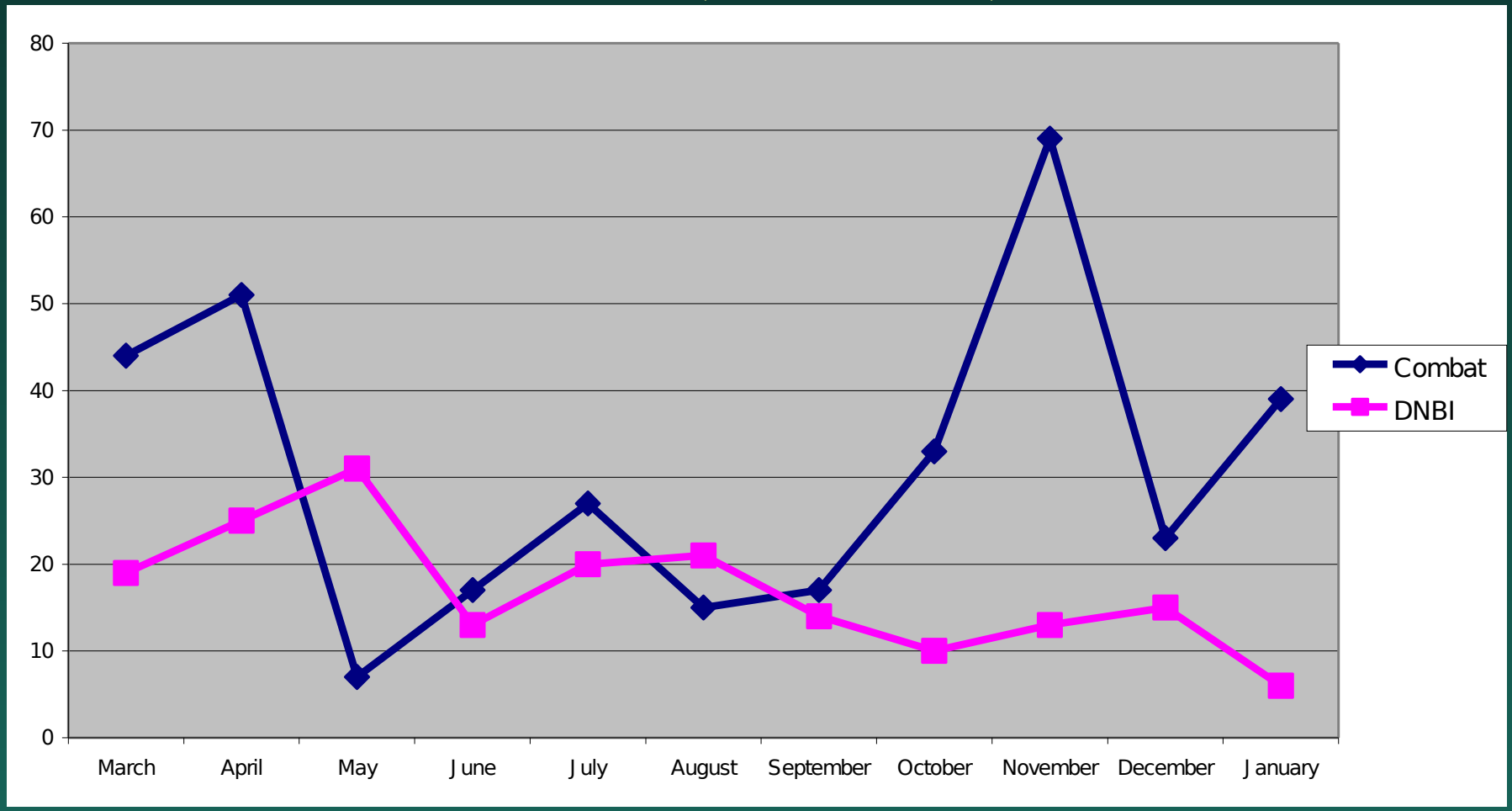
n=372



*Source: Writer: JAMA, Vol 275(2). Jan 10, 1996 118-121

Mortality Surveillance

Fatalities: Combat (n=342) vs. DNBI (n=187)



Mortality
Surveillance

Overall Army OIF DNBI ranked by etiology

1. Ground transportation-60/187 (32%)
2. Rotary mishap-23/187 (12%)
3. Suicide-23/187 (12%)
4. Natural (all combined)-16/187 (9%)
5. Weapon d/c or UXO-15/187(8%)
6. Pending determination-12/187(6%)
7. Drowning-11/187 (6%)

DNBI, Not Safety: 57/529 (11%)

- 23 Suicides
- 6 Heat injuries
- 16 Natural deaths
  - 6 ASCVD
  - 3 Cancer (Leukemia,Adeno, Colon)
  - 2 CVA
  - 2 Pneumonia
  - 2 Pulmonary embolism
  - 1 Undetermined
- 12 Pending investigation (8 are gunshot wounds)

Suicides: 23

Suicides by OIF Status and Branch (March 19, 2003 to January 31, 2004)						
OIF Status		Army	Air Force	Marines	Navy	Total
OIF		21	0	1	0	**22**
Post-OIF		3	0	1	0	**4**
	<120 Days	2	0	1	0	
	>120 Days	1	0	0	0	
Non-OIF		34	33	19	32	**118**
					Total Suicides:	**144**

AFIP Toxicology Screening			
OIF Status		Tox Reports	Mefloquine
OIF		22	1
Post-OIF		1	0
	<120 Days	1	0
	>120 Days	0	N/A
Non-OIF		42	0

Mortality Surveillance

Heat Injury Deaths: 6

- 3/6 “Heat Stroke”, 3/6 “Heat-Related Deaths”
  - 1 Occurred after running PT in Iraq (July)
  - 5 Occurred at rest over a 9 day period of extreme heat (6-14 August). Dry temps >120.
    - One presented with seizure, Temp 105 and with hyponatremia (Na reportedly 108)
    - Other 4 were found dead in their cots, 2 with core temps >105
    - Toxicology negative in all cases
    - Cardiovascular path consulted in all 5 cases-1 with mild RVH, 1 with moderate ASCVD, 1 with mild cardiac enlargement with biventricular dilation. No smoking guns.

Natural Deaths: ASCVD: 6

- 3 in Kuwait, 1 in Bahrain, 2 in Iraq
- Age range 38-46, with a 55yo outlier
- Ranks: E-5 (55yo), E-6 x2, E-7, O-5 x2
- 1 was PT related (running on treadmill)
- 3 were NG, 1 Reserve, 1 AD Army, 1 AD Navy
- Medical records available for 3: all w/ multiple risk factors
- All with extensive disease

Pneumonia deaths: Case #1 History

- 11JUN 24 yr-old E5 presented to 47th BAS with 4-day hx of cough, dyspnea, fever

  Rx: ibuprofen, ranitidine, prednisone
- 14JUN Returned with worsening dyspnea, fatigue; Dx: RLL pneumonia + dehydration

  Rx: ceftriaxone; azithromycin; acetaminophen
- 15JUN Progressive tachycardia, decreasing O2 sat; Evac'd to 28th CSH; CXR bilat diffuse infiltrate; presumptive dx mycoplasma; admitted to ICU

  Rx: levofloxacin IV, O2 6L
- 16JUN Intubated; red tinged yellow sputum; transferred to MASF

  Rx: gatifloxacin, O2 100%; propofol, vecuronium
- 17JUN Cardiopulmonary arrest during preparation for stratevac to LRMC; Died 0035Z after approx 1 hr ACLS protocol

Pneumonia deaths: Case #2: History

- 30JUN 20 yr-old E4 presented to 47th BAS with 1-day hx of productive cough, dyspnea, and chest pain; intubated and transferred to 28th CSH

  Rx: Azithromycin; doxycycline; levofloxacin; gentamycin
- 30JUN On arrival to 28th CSH, diagnosed w/ pneumonia and ARDS, with a 100% O2 requirement. CXR-patchy infiltrates bilateral lower lung fields. WBC>20.

  Rx: imipenem; doxycycline; levaquin; nebs
- 3JUL Bilateral chest tubes placed, ?empyema
- 4 JUL Stratevac to LRMC. Noted to have 10% eosinophils on smear. Remained in ICU.

  Rx: methylprednisolone
- 10JUL Renal and liver failure.
- 12JUL Cardiopulmonary arrest during transfer to civilian facility for dialysis.

Pneumonia deaths: Anatomic

- Case #1
  - Diffuse alveolar damage and pulmonary eosinophilia
  - Pulmonary edema, bilateral
  - Hydrothorax, bilateral
- Case #2
  - Diffuse alveolar damage; Pulmonary edema, bilateral; Bilateral pleural effusions
  - Multiple Organ System Failure
    - Anasarca
    - Severe passive congestion of the liver w/ ascites
    - Marked cerebral edema
    - Pericardial effusion

Pneumonia deaths: Pulmonary Path

- Acute phase Diffuse Alveolar Damage
  - No progression to organization
- No cytologic changes indicative of a specific virus identified
- NOT hypersensitivity pneumonitis
  - Case #1: Eosinophils could represent eosinophilic DAD/acute eosinophilic pneumonia
  - Case #2: H&E stain demonstrates Gr (-) rods c/w Klebsiella under the pleural surface
- Etiology most likely infectious/viral

Pneumonia deaths

- Extensive and exhaustive testing performed
- Specimens sent to: Pulmonary Pathology, Environmental Pathology and Infectious Disease departments of AFIP, WRAIR, USAMRIID, Mayo Clinic, CDC, Duke and NIOSH
- Micro positive for Klebsiella and Candida in one case, negative for all pathogens in the other
- Environmental study (case/control) by Duke showed no evidence that the lung injury was due to exposure to inorganic particulate matter
- Results from NIOSH still pending

Crossover Story: Drowning in the Desert

31 deaths with “Drowning” as cause of death

- 20 Army, 11 USMC
- 10 before 1 May, 21 after 1 May
- 16 associated with ground vehicles, 7 associated with helicopter mishaps, 4 from swimming and 4 during operations
- The 4 swimming incidents were all in Army personnel, and all after 1 May

Strengths

- Complete capture of in-theater deaths
- Complete visibility of DoD deaths
- Support via DoD-GEIS
- Command support

Limitations

- Sparse ante-mortem information
- Lack of in-theater medical treatment records
- Post-mortem microbiology hampered by transit time and decomposition
- Possibility of missed autopsies in post-OIF cases
- Difficult to nail down denominators